That Which Is Claimed Is:

1. A chip diffuser that is useful in efficiently distributing particulate material, comprising:

a central shaft stem;

a spider helix rotor assembly that comprises a spider hub that is rotatably mounted onto said central shaft stem and at least two vane mounting rods that are non-radially attached to said spider hub; and

substantially planar vanes that are attached at an angled pitch to said vane mounting rods, said vanes having a top surface and a bottom surface.

2. A chip diffuser according to Claim 1, wherein said spider helix rotor assembly is rotatably mounted atop said central shaft stem.

3. A chip diffuser according to Claim 1, wherein said spider helix rotor assembly is rotatably mounted along said central shaft stem.

4. A chip diffuser according to Claim 1, wherein said spider helix rotor assembly is rotatably mounted beneath said central shaft stem.

5. A chip diffuser according to Claim 1, wherein said spider helix rotor assembly is substantially planar.

6. A chip diffuser according to Claim 1, wherein said vane mounting rods are near-tangentially attached to said spider hub.

7. A chip diffuser according to Claim 1, wherein said spider helix rotor assembly comprises between about four and eight vane mounting rods that are uniformly spaced around said spider hub.

8. A chip diffuser according to Claim 1, wherein said spider helix rotor assembly comprises six vane mounting rods that are uniformly spaced around said spider hub.

9. A chip diffuser according to Claim 1, wherein said spider helix rotor assembly has a leading arrangement whereby said vane mounting rods are oriented toward the direction of rotation.

10. A chip diffuser according to Claim 9, wherein said spider helix rotor assembly is configured such that its vane mounting rods are non-radially oriented between about 50° and 80° from tangents intersecting contact points defined by said vane mounting rods and said spider hub.

11. A chip diffuser according to Claim 1, wherein said spider helix rotor assembly has a lagging arrangement whereby said vane mounting rods are oriented away from the direction of rotation.

12. A chip diffuser according to Claim 1, wherein said spider helix rotor assembly is collapsible.

13. A chip diffuser according to Claim 1, wherein said vanes are attached to said vane mounting rods in a one-to-one relationship.

14. A chip diffuser according to Claim 1, wherein said vanes are substantially rectangular.

15. A chip diffuser according to Claim 1, wherein said vanes are attached to said vane mounting rods at a pitch of between about 10° and 40°.

16. A chip diffuser according to Claim 1, wherein said vanes are attached to said vane mounting rods at a pitch of between about 20° and 30°.

17. A chip diffuser according to Claim 1, wherein said vanes are attached to said vane mounting rods at a pitch of between about 22° and 25°.

18. A chip diffuser according to Claim 1, wherein said vanes are collapsible.

19. A chip diffuser according to Claim 1, further comprising means to support the chip diffuser during operation, said support means connected to a non-rotating component of said chip diffuser.

20. A chip diffuser according to Claim 19, wherein said support means is connected to said central shaft stem.

21. A chip diffuser according to Claim 1, further comprising at least one J-shaped support to secure the chip diffuser from beneath, each said J-shaped support incorporating said central shaft stem.

22. A chip diffuser according to Claim 21, further comprising a feed chute that is connected to said at least one J-shaped support and that is positioned above said spider helix rotor assembly to facilitate the delivery of particulate material to said chip diffuser.

23. A chip diffuser according to Claim 1, further comprising governing means to limit the chip diffuser's rotational speed during operation.

24. A chip diffuser according to Claim 23, wherein said governing means comprises a governor bar on the backside of at least one said vane.

25. A chip diffuser according to Claim 24, further comprising a collector bar connected to said governor bar.

26. A chip diffuser according to Claim 23, wherein said governing means comprises a governor bar on the backside of each said vane.

27. A chip diffuser according to Claim 23, wherein:

said governing means comprises a governor bar on the backside of a first said vane; and

said governor bar and a second said vane are configured in a trough-forming geometry.

28. A chip diffuser according to Claim 1, further comprising a collector bar connected to at least one said vane.

29. A chip diffuser according to Claim 1, further comprising at least one power bar on the top surface of at least one said vane.

30. A chip diffuser according to Claim 1, further comprising at least one power bar on the top surface of each said vane.

31. A chip diffuser according to Claim 1, further comprising a toe bar connected to the lower edge of at least one said vane.

32. A chip diffuser according to Claim 1, further comprising a toe bar connected to the lower edge of each said vane.

33. A chip diffuser according to Claim 32, wherein each said toe bar is angled up to about 30° from the top surface of its corresponding vane.

34. A chip diffuser according to Claim 32, wherein each said toe bar is angled up to about 90° from the top surface of its corresponding vane.

35. A chip diffuser according to Claim 34, wherein each said toe bar comprises a curved section.

36. A chip diffuser according to Claim 1, further comprising a vane plate that is attached either to said central shaft stem or to the upper edges of a plurality of said vanes.

37. A chip diffuser according to Claim 1, further comprising a stream divider mechanism positioned over said central shaft stem.

38. A chip diffuser according to Claim 1, wherein said chip diffuser is capable of functioning using only the kinetic energy of particulate material contacting said chip diffuser.

39. A chip diffuser according to Claim 1, wherein the chip diffuser is capable of distributing at least about five tons of wood chips per minute.

40. A chip diffuser according to Claim 1, wherein the chip diffuser is capable of distributing at least about 15 tons of wood chips per minute.

41. A chip diffuser according to Claim 1, wherein the chip diffuser is capable of distributing at least about 30 tons of wood chips per minute.

42. A method of using the chip diffuser according to Claim 1, comprising feeding particulate material onto said spider helix rotor assembly and said attached vanes of said chip diffuser, thereby effecting the rotation of said spider helix rotor assembly and said attached vanes around said central shaft stem and the outward redirection of particulate material.

43. A method of using the chip diffuser according to Claim 42, further comprising positioning said chip diffuser under a feed chute prior to the step of feeding particulate material onto said chip diffuser.

44. A method of using the chip diffuser according to Claim 42, further comprising moving said chip diffuser about a space to distribute the particulate material within the space.

45. A method of using the chip diffuser according to Claim 42, wherein the step of feeding particulate material onto said chip diffuser comprises feeding wood chips onto said chip diffuser.

46. A method of using the chip diffuser according to Claim 42, wherein the step of feeding particulate material onto said spider helix rotor assembly and said attached vanes of said chip diffuser

comprises feeding at least about five tons of wood chips per minute onto said spider helix rotor assembly and said attached vanes of said chip diffuser.

47. A chip diffuser that is useful in efficiently distributing wood chips and other particulate materials, comprising:

a central shaft stem;

a substantially planar spider helix rotor assembly that comprises a spider hub that is rotatably mounted onto said central shaft stem and between four and eight vane mounting rods that are uniformly and non-radially attached to said spider hub; and

vanes that are attached in a one-to-one relationship to said vane mounting rods at a pitch of between about 10° and 40°, said vanes having a top surface and a bottom surface.

48. A chip diffuser according to Claim 47, wherein said spider helix rotor assembly is in a leading arrangement wherein its vane mounting rods are non-radially oriented between about 50° and 80° from the respective tangents intersecting contact points defined by said vane mounting rods and said spider hub.

49. A chip diffuser according to Claim 47, wherein said vanes are attached to said vane mounting rods at a pitch of between about 20° and 30°.

50. A chip diffuser according to Claim 47, further comprising governing means to limit the rotational speed of the chip diffuser during operation.

51. A chip diffuser according to Claim 47, further comprising at least one power bar on the top surface of at least one said vane.

52. A chip diffuser according to Claim 47, further comprising a toe bar connected to the lower edge of each said vane.

53. A chip diffuser according to Claim 52, wherein each said toe bar is angled up between about 15° and 90° from the top surface of its corresponding vane.

54. A chip diffuser according to Claim 47, further comprising a collector bar connected to each said vane.

55. A chip diffuser according to Claim 47, further comprising a stream divider mechanism positioned over said central shaft stem.

56. A chip diffuser according to Claim 47, wherein said spider helix rotor assembly includes exactly six vane mounting rods and said vanes include exactly six vanes.

57. A chip diffuser according to Claim 56, wherein:

the first, third, and fifth vanes each comprise at least one power bar that is inwardly directed; and

the second, fourth, and sixth vanes each comprise at least one power bar that is outwardly directed.

58. A chip diffuser according to Claim 56, wherein said vanes include toe bars in an alternating toe bar arrangement.

59. A chip diffuser according to Claim 47, wherein said chip diffuser is capable of efficiently distributing particulate material by rotating around its said central shaft stem using only the kinetic energy of the particulate material contacting said chip diffuser.

60. A chip diffuser according to Claim 47, wherein the chip diffuser is capable of distributing at least about five tons of wood chips per minute.

61. An improved method of efficiently distributing particulate material, comprising:

providing a chip diffuser that comprises a central shaft stem, a rotor assembly that is rotatably mounted onto the central shaft stem and that has at least two vane mounting rods, and vanes that are attached at an angled pitch to the vane mounting rods; and

feeding particulate material onto the chip diffuser, thereby effecting the rotation of the rotor assembly and the attached vanes around the central shaft stem and the outward redirection of the particulate material;

wherein the energy necessary to rotate the rotor assembly and the attached vanes is provided by only the kinetic energy of particulate material contacting the chip diffuser.

62. An improved method of distributing particulate material according to Claim 61, wherein the rotor assembly is a spider helix rotor assembly characterized by vane mounting rods that are non-radially attached to a spider hub.

63. An improved method of distributing particulate material according to Claim 61, wherein the step of feeding particulate material onto the chip diffuser comprises transferring particulate material through a feed chute onto the rotor assembly and the attached vanes.

64. An improved method of distributing particulate material according to Claim 63, wherein the step of transferring particulate material through a feed chute onto the rotor assembly and the attached vanes comprises transferring particulate material through an substantially vertical feed chute onto the rotor assembly and the attached vanes.

65. An improved method of distributing particulate material according to Claim 63, wherein the step of transferring particulate material through a feed chute onto the rotor assembly and the attached vanes comprises transferring particulate material through a non-vertical feed chute onto the rotor assembly and the attached vanes.

66. An improved method of distributing particulate material according to Claim 63, wherein the step of transferring particulate material through a feed chute onto the rotor assembly and the attached vanes comprises focusing the transfer of particulate

material off the center of the rotor assembly and the attached vanes.

67. An improved method of distributing particulate material according to Claim 61, further comprising moving the chip diffuser about a storage space to further distribute particulate material within the storage space.

68. An improved method of distributing particulate material according to Claim 61, wherein the step of feeding particulate material onto the chip diffuser comprises feeding wood chips onto the chip diffuser to thereby increase the compaction of the distributed wood chips by at least about five percent.

69. An improved method of distributing particulate material according to Claim 61:

wherein the step of feeding particulate material onto the chip diffuser comprises feeding wood chips onto the chip diffuser; and

further comprising moving the chip diffuser about a storage space to further distribute wood chips within the storage space to thereby increase the compaction of the distributed wood chips by at least about 15 percent.

70. An improved method of distributing particulate material according to Claim 61, wherein the step of feeding particulate material onto the chip diffuser comprises feeding wood chips onto the chip diffuser at a rate of at least about five tons per minute.

71. An improved method of distributing particulate material according to Claim 61, wherein the step of feeding particulate material onto the chip diffuser comprises feeding wood chips onto the chip diffuser at a rate of at least about 15 tons per minute.

72. An improved method of distributing particulate material according to Claim 61, wherein the step of feeding particulate material onto the chip diffuser comprises feeding wood chips onto the chip diffuser at a rate of at least about 30 tons per minute.

73. An improved method of efficiently distributing wood chips, comprising:

providing a chip diffuser that comprises a central shaft stem, a spider helix rotor assembly that comprises a spider hub that is rotatably mounted onto the central shaft stem and at least two vane mounting rods that are non-radially attached to the spider hub, and an least one substantially planar vane that is

attached at an angled pitch to each vane mounting rod, wherein at least one vane includes a toe bar formed at its lower edge; and

feeding wood chips onto the chip diffuser, thereby effecting the rotation of the rotor assembly and the attached vanes around the central shaft stem and the outward redirection of the wood chips;

wherein the energy necessary to rotate the rotor assembly and the attached vanes is provided by only the kinetic energy of wood chips contacting the chip diffuser.

74. An improved method of distributing wood chips according to Claim 73, wherein the step of feeding wood chips onto the chip diffuser comprises feeding wood chips at a rate of at least about five tons per minute.

75. An improved method of distributing wood chips according to Claim 73, further comprising moving the chip diffuser about a space to further distribute wood chips within the space to thereby increase the compaction of the distributed wood chips by at least about 15 percent.